GB 21476 (5)

PATENT SPECIFICATION

NO DRAWINGS

Inventors: FRANCIS LEONARD DALTON and JOHN DAVID McCANN

1,193,511

1,193,511

Date of filing Complete Specification: 21 June, 1968.

Application Date: 21 June, 1967. No. 28748/67.

Complete Specification Published: 3 June, 1970.

Index at acceptance: —B6 A42A; B6 CAX

International Classification: —B 41 m 3/14

COMPLETE SPECIFICATION

Improvements in or relating to Protecting Securities Against Forgery

We, UNITED KINGDOM ATOMIC ENERGY AUTHORITY, London, a British Authority, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention concerns improvements in protecting securities against forgery and is specifically designed to be applied to any security as a certification marking or the like indicating that the security is valid for some specific purpose.

Thus in the GIRO system, a cheque issued by a drawer is sent to a central point at which the drawer's credit is examined and the cheque certified for payment. The certified cheque is then sent to the payee and may be exchanged for cash at a Post Office. It is obviously desirable that the certification on the cheque should be done in a way which is not readily amenable to forgery so that a certified cheque is not readily forgeable. It is clear that since certified cheques are exchangeable for cash they would form a tempting field for the forger.

It will also be apparent that there are many other securities of negotiable value which may at some stage be certified for payment whilst they are not so certified at another stage. For example even bank notes, especially high value notes, can be so considered, it being desirable that they should be valueless before issue or after withdrawal for destruction.

It is an object of the present invention to provide a new or improved form of certification.

According to the present invention, there is provided a security having an area of radiation sensitive printing ink or paint and certified by an electron beam radiation-induced colour change over a selected portion of such area.

From a further aspect the invention provides a method of effecting certification of a security comprising providing the security with an area of radiation sensitive printing ink or paint and causing a colour change in a selected portion of this area by irradiating the same with an electron beam.

It will be understood that the "certification" may render the security valid or cancel its validity as required.

The term "security" as used herein is intended to define any negotiable document which may require certification as above defined. For example in the case of bank notes, the irradiation may be effected immediately prior to issue, thus validating the note, or on withdrawal to invalidate the note.

More particularly the present invention is concerned with the form of security called herein a "cheque blank". This term is used herein to define that piece of paper which is certified by the central GIRO system and which contains, in addition to the area of radiation sensitive printing ink, a space for details of the amount payable and such other information as may be desirable.

It is possible to use either of two classes of printing ink or paint. The first such class comprises a dye which is inherently sensitive to radiation dispersed in an inert carrier, whilst the second class comprises a carrier which is sensitive to radiation, including a dye detecting changes in the carrier. In either case a dye which is not affected can be included to give alternative colour changes.

As examples of the first class of ink or paint, it is possible to use dyes which are bleached by radiation, for example methylene blue in a carrier such as a cellulose derivative. Alternatively it is possible to use dyes which are irradiated in the leuco form to cause a colour to develop, for example the leuco

cyanides of triarylmethane dyes e.g. malachite green

However we prefer to use ink or paint in the second class and very desirably ink or paint of the general type disclosed in our prior patents, Nos. 920689 and 1040704 which incorporates a halogen-containing polymer, for example polyvinyl chloride or polyvinylidene chloride, which is sensitive to radiation and an indicator which changes colour in the presence of liberated hydrogen chloride.

The area of radiation sensitive ink or paint may be incorporated within the security during manufacture or may be applied to one or both surfaces thereof subsequently.

The irradiation may be effected by a scanning technique or by a fixed beam through a mask or by a combination of these techniques.

The electron beam causes a localised breakdown in the polymer and the liberation of hydrogen chloride in the parts scanned by the beam and this will in turn cause a colour change in the indicator. Since the degree of colour change depends upon the degree of radiation and since the electron beam can be of variable intensity or speed of movement, a progressive colour change can be obtained along the line of scanning. Moreover, if the electron beam is slightly defocused a continuous colour change is obtained transverse to the line of scan. Moreover, scanning can be effected through a mask which may be partially or completely opaque to the radiation and can be of differing effective densities over specific locations so as to impart a stepwise change in the colour produced.

Finally it may or may not be desirable to provide a protective coating over the radiation sensitive area in order to protect it from ultra violet light which will have the effect of destroying the marking produced by the electron beam. In particular, it may be desirable to apply a protective coating of such a thickness that normal exposure to daylight has no effect upon the marking but for use with GIRO cheques to provide each Post Office with an intense source of ultra violet light. Thus, as an additional check, each Post Office will irradiate the certified cheque with ultra violet light and observe that the certification marking is in fact destroyed. This will have the twofold advantage of preventing forging by simple conventional printing and at the same time cancelling the certification mark. It will be appreciated that once the certification has been cancelled in this way it cannot be reapplied since the coupling of the acid sensitive dye with the released hydrogen chloride cannot readily be reversed.

In a preferred arrangement, the cheque blank is provided with a panel, for example of rectangular shape, of radiation sensitive printing paint or ink in accordance with our said British Patents. The preferred acid sensitive dye being di-ethyl yellow, the normal colour of this panel is in fact yellow and very conveniently the base colour of the cheque blank is therefore also yellow, but it will be understood that other acid sensitive indicators can be used. The area occupied by this panel of radiation sensitive paint or ink is not designal to be used when filling in the cheque blank with details of payments etc.

When a cheque blank has reached the central accounting office and has been passed for payment, the radiation sensitive area is scanned by a slightly defocused electron beam from an accelerator, conveniently operating in the range 150—300 kV. The pattern of scanning is designed to produce the conventional curves that are found on bank notes and the like. However, interposed between the electron accelerator and the cheque blank is a mask which, for example, shows the date in characters that are effectively opaque to the radiation. As a result of this operation, the radiation sensitive area will show a pattern of red lines surrounding the data which remains in yellow, the lines being on a yellow background.

As explained, the electron beam is slightly defocused so that the lines do not have a sharp edge but merge gradually from yellow to red across the width of the line. However, where any line crosses the date there is a sharp change in colour. Similarly, the intensity of the electron beam can be varied during the scanning so that the intensity of any given line varies along its length.

As explained in our said prior patents, the area of radiation sensitive ink is desirably covered by a layer of a material which is effectively opaque to ordinarily ultra violet light, this layer being transparent to visible light.

The cheque has now been certified and may be presented for payment at any suitable Post Office. Such a Post Office is provided with a high intensity ultra violet lamp and the clerk before making payment floods the cheque with this ultra violet light for a sufficient period of time to cause a breakdown of the polymer and the release of enough hydrogen chloride to cause the entire radiation sensitive area to turn red. Providing that this effect takes place, the clerk may then make the payment, being satisfied that the certification mark has not been forged by a conventional printing technique. At the same time the certification is cancelled in such a way that it cannot easily be reformed and the cheque is therefore worthless.

WHAT WE CLAIM IS:—

1. A method of effecting certification of a security comprising providing the security with an area of radiation sensitive printing ink or paint and causing a colour change in a selected portion this area by irradiating the same with an electron beam.

2. A method according to claim 1, wherein the electron beam is scanned over the said area.

3. A method according to claim 2, wherein the electron beam is varied in intensity or speed of movement during scanning.

4. A method according to claim 2 or 3, wherein the electron beam is defocused.

5. A method according to any of the preceding claims wherein the irradiation is effected through a mask having areas opaque to the electron beam.

6. A method according to any of the preceding claims wherein the said area is provided with a protective coating opaque to the ultra violet content of sunlight.

7. A method of effecting certification of a security substantially as hereinbefore described.

8. A security having an area of radiation sensitive printing ink or paint and certified by an electron beam radiation-induced colour change over a selected portion of such area.

9. A security when certified by the method of any of claims 1 to 7.

A. N. CALDWELL,
Chartered Patent Agents,
Agent for the Applicants.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1970.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.